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years of age. In these cases the excrescence was a tumour no larger than a pea, but the appearance of which threatened the formation of a cancer. Both these were successfully removed by the ligatures above described; and, except a small fissure, no kind of deformity was left upon the tongue.

The principal inference derived from these operations is, that the internal structure of the tongue is less irritable than almost any other organized part of the body; and that therefore the peculiar substance which is interposed between the fasciculi of its muscular fibres is not in any respect connected with the nerves which pass through its substance to the organ of taste, but is merely a soft medium, which is intended to facilitate the action of the organ in its different parts. It also appears from these observations, that the nerves of the tongue may be more easily compressed and deprived of their power of communicating sensation than nerves in general; and that an injury inflicted on them is not productive of any diseased action in the trunk of the injured nerve.

Lastly, the advantages to be derived in the practice of surgery from the success of these operations, are briefly stated; and indeed the removing with safety the whole part of a tongue which may have taken on a disposition to be cancerous, will easily be allowed to be a most material improvement in that important branch of the medical profession.

Observations of the Transit of Mercury over the Disc of the Sun; to which is added, an Investigation of the Causes which often prevent the proper Action of Mirrors. By William Herschel, LL.D. F.R.S. Read February 10, 1803. [Phil. Trans. 1803, p. 214.]

Concerning the transit of Mercury, as the times at which the observations were made were not the chief object of the investigation, the detail here given is only to be considered as denoting the order of their succession. When the planet was first seen on the disc of the sun on the 9th of November last at about 40' after seven in the morning, it was easily distinguished from the openings in the luminous clouds generally called spots, its perfect roundness being sufficient to point it out, had its place not been previously known. As the morning advanced, its termination became by degrees still more accurately defined; and the corrugations of the luminous surface of the sun were visible up to the very edge of the planet. Near the egress, when the sun and planet were nearly in the meridian, particular attention was paid to the appearance that was thought to indicate an atmosphere round Mercury; but nothing of the kind could be perceived, its periphery remaining sharp and well defined to the very last. It was also observed that the appearance of the planet, during the whole transit, never deviated in the least from the spherical form; whence it is inferred, that unless its polar axis should have happened to be situated in a line drawn from the eye to the sun, the planet cannot be materially flattened at its poles.

Concerning the second part of this paper, namely, the causes which often affect mirrors so as to prevent their showing objects distinctly, though it be well known to astronomers that telescopes will act very differently at different times, yet no particular inquiry had yet been made respecting the cause of this imperfection. The experience our author has acquired during his long series of observations, in which he never lost sight of this circumstance, has enabled him to combine a set of facts, from which he thinks himself authorized to deduce inferences which will be found to throw a considerable light upon the subject.

These observations are here described at length, and arranged under different heads, chiefly according to the state of the atmosphere at the time they were made. Their results will in some measure point out the nature of them. They seem to establish, as a general principle, that in order to see distinctly with "telescopes, it is required that the temperature of the atmosphere and mirror should be uniform, and that the air be impregnated with moisture." Hence it appears that a frost after mild weather, or a thaw after frost, will sensibly derange the performance of our mirrors, till either the frost or the mild weather are sufficiently settled that the temperature of the mirror, and indeed of the whole telescope, may accommodate itself to that of the air. That when a frost, though very severe, becomes settled, the mirror will soon accommodate itself to the temperature, and the telescope will be found to act well. That no telescope brought into a cold atmosphere out of a warm room, can for a time be expected to act properly; and that no delicate observations, with high magnifying powers, can well be made when looking through a door, window, or slit in the roof of an observatory. It equally appears that windy weather in general, which must occasion a mixture of airs of different temperatures, cannot be favourable to distinct vision: and that the auroræ boreales, when they induce, as they often do, a considerable change in the temperature of the different regions of air, are likewise detrimental as to distinctness.

Sometimes the weather may be perfectly serene, and yet the telescopes will act imperfectly. This may be owing to the dryness occasioned by easterly winds, or by a change of temperature arising from an agitation of the upper regions of the atmosphere, or perhaps by both these causes combined together.

Dry air, it seems, is by no means proper for vision; and hence dampness, haziness, and fogs, to a certain degree, will generally be found favourable to distinctness: damp situations, therefore, and the neighbourhood of lakes or rivers, need not be objected to in choosing a spot for an observatory. As the warm exhalations of the roof of a house in a cold night must disturb the uniformity of the temperature of a certain contiguous portion of air, it is to be expected that the appearance of stars seen over a house, and at no considerable distance from it, will be affected by that emanation.

Lastly, one of the most essential causes of the want of uniformity in the performance of telescopes must, it seems, be ascribed to the

effects of heat and cold upon the figure of the mirrors. This circumstance has called forth a particular investigation, in which heated bodies were approached at different distances, both before and behind mirrors, either of glass or metal; and it was remarkable how their focal lengths were immediately affected by it. Hence it may reasonably be inferred, that the rays of the sun on a mirror will produce a similar distortion. That the dilatation occasioned by heat is the cause of this defect, will easily be admitted; but our author does not enter here upon the theory of this influence, nor upon the remedies that may be applied to its detrimental consequences. These points he reserves for a future communication.

An Account of some Experiments and Observations on the constituent Parts of certain astringent Vegetables; and on their Operation in Tanning. By Humphry Davy, Esq. Professor of Chemistry in the Royal Institution. Communicated by the Right Hon. Sir Joseph Banks, Bart. K.B. P.R.S. Read February 24, 1803. [*Phil. Trans.* 1803, p. 233.]

The importance of the subject handled in this paper, which, as it particularly relates to the process of tanning leather, will be allowed to be of sufficient magnitude, has of late excited the attention of several able philosophers, among whom Mr. Seguin was the first who ascertained the peculiar vegetable matter which is essential to this process, and which is possessed of the characteristic property of precipitating gelatine from its solutions. Mr. Proust has since investigated many other properties of this substance; but neither these, nor any other chemists, have as yet carried their investigations so far as to determine the various affinities of tannin, and especially how its action upon animal matters is modified by combination with other substances. This task was reserved for our author, who during the two last years bestowed most of his leisure hours on a course of experiments on this subject; and he here lays before the Society an account of their general results. His chief design was to elucidate the practical part of the process; but in pursuing it he found himself necessarily led to general chemical inquiries concerning the analysis of the different vegetable substances containing tannin, and their peculiar properties.

The paper consists of five parts, the titles of which are as follows:—1. Observations on the analysis of astringent vegetable infusions. 2. Experiments on the infusions of galls. 3. Experiments and observations on the extracts of Catechu, or Terra Japonica. 4. Experiments and observations on the astringent infusions of barks, and other vegetable productions; and 5. General observations.

And first, as to the analysis of astringent vegetable infusions; the substances that have been supposed to exist most generally in them are tannin, gallic acid, and extractive matter. The presence of tannin in an infusion is denoted by the precipitate it forms with gelatine, such as glue or isinglass; but the process requires many and